Combatting Iron-Deficiency in Ethiopia: Exploring the Link Between Iron-Supplementation and Malaria

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[Photo: Children in Ethiopia]

Iron-deficiency anemia is a major health problem in Ethiopia. But public-health officials are in a quandary concerning how to increase the population's iron intake. At issue is whether giving people iron supplements actually does more harm than good by making them more susceptible to malaria, which is also widespread.

With funding from the International Development Research Centre (IDRC) and eight other organizations, scientists at McGill University in Canada and in Ethiopia have shown that iron supplementation may indeed increase the risk of contracting malaria. Their results — a product of the McGill-Ethiopia Community Health Project, a joint initiative to train health care professionals in postgraduate research — indicate a need to integrate iron deficiency treatment programs with those for malaria control.

Field trials

Hailemichael Gebreselassie and Zenaw Adam were the principal investigators of two large randomized field trials conducted in northwestern Ethiopia, where 64% of the population is exposed to malaria. Dr Gebreselassie is now the Head of the Department of Food Science and Nutrition Research at the Ethiopian Health and Nutrition Research Institute in Addis Ababa. His study involved children in the Beles Valley (Pawe) resettlement area between the ages of 5 and 14 years, who were mild to moderately anemic. The results showed that 20.2% of the 223 children receiving iron supplements had at least one clinical malaria attack over a 24-week follow-up period compared with 14.0% among the 222 children in a placebo group. Although the difference between the groups was not statistically significant, it does suggest an increased susceptibility to malaria infection among iron-supplemented children.

Nonetheless, Dr Gebreselassie believes that the benefits of iron supplementation outweigh the potential risk of malaria infection. "Iron supplementation was found to markedly improve the [subjects'] iron status," he explains. Moreover, his study helped highlight areas where more research is needed. It also gave Ethiopia a useful database on iron-deficiency anemia, and local physicians are already applying the results.

More fevers

In the second study, Zenaw Adam, of the London School of Hygiene and Tropical Medicine, found that 63.9% of anemic women in Metema, Ethiopia who were receiving iron supplements experienced fever episodes over the 12 weeks of the trial compared to 55.3% among women who received a placebo. Similarly, anemic children between the ages of 6 and 84 months who were receiving iron supplements had more fevers than children in the placebo group (68.9% vs. 58.9%).

"The difference between the two groups of children is not great," says one of the investigators, Theresa Gyorkos, an associate professor at McGill University and Associate Director of the Division of Clinical Epidemiology at Montreal General Hospital. "But we want to be cautious. Let's be sure that when we are treating anemia, we are not creating a malaria problem."

Public health education

Dr Gyorkos says that a key element of any integrated treatment program must include the education of health professionals in the field. This is particularly important in light of the prevalence of iron deficiency anemia, which, until recently, had not been considered a public health problem in Ethiopia.

"We know that anemia has been underestimated," she explains. More than 30% of Ethiopians suffer from the condition, whose symptoms include fatigue, weakness, and dizziness. In the worst cases, it can lead to liver damage, edema, and heart failure and it increases the risk of death of pregnant women at delivery.

Pre-school children

In another IDRC-funded study involving the McGill-Ethiopia team, Abdulaziz Adish examined the causes of anemia in pre-school children. He says that about 42% of pre-schoolers are anemic, mostly due to iron deficiency. Apart from inadequate intake, the children also have problems absorbing what iron they do get. Dr Adish found many contributing factors including poverty, lack of clean water, illiteracy, maternal illness, and food insecurity. For example, Ethiopians rarely eat meat, which helps the body absorb iron.

Vitamin C can improve iron absorption, but it is in short supply. One successful and relatively inexpensive intervention involves the use of iron pots. Teff, an iron-rich cereal, is a staple of the Ethiopian diet. If teff is cooked in an iron pot with vegetables or meat, small amounts of vitamin C from these foods enable the body to make more efficient use of the iron that is both found in the food and leached from the pot, says Dr Adish.

Iron toxicity?

But before any community-wide program is implemented, Dr Adish recommends that more research on the issue be conducted. "We must determine if long-term use of iron cooking pots causes iron toxicity," he says.

According to Dr Gyorkos, these investigations have influenced health policy in Ethiopia by focusing attention on the iron deficiency problem. Results from the McGill-Ethiopia Community Health Project are also being incorporated into the country's new five-year plan for research in health and nutrition.

by Phillipa Rispin, a Montreal-based writer and editor (with files from J. Pepall). [Photo: J. Johnston, IDRC].

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